

1 Introduction

This project assignment is to expose MATH 3370 students to real applications of the modeling and analysis approaches we study in the course. In particular, we will see how some of the ideas that we used could actually be applied to the development and infrastructure of the communities surrounding Morris, Minnesota.

2 Contents

There are basically 4 different miniprojects which are, in some sense, tied together in one common theme of combinatorial and discrete optimization.

These topics and projects include:

- **Transportation Network Flow.**

Using maps provided from the Department of Transportation in West Central Minnesota, students will analyse the transportation networks in and around the City of Morris. This includes studying the current traffic flow conditions, incorporating attributes like zoning and specific locations.

- **Congestion and Network Design.**

Using population estimates and land use characteristics, traffic patterns will be viewed within both the City of Morris and the region in its vicinity as a whole. Current estimates for the pertinent data and information will be provided by the regional coordinator Al Wolffe.

Based on the aforementioned summary, a network design project will be carried out. This project will examine the past, present, and future road constructions; in particular, it will research on the issues of feasibility, benefits, and recommendations.

Other factors involved with local decision making processes will be obtained from the Minnesota's Department of Transportation.

- **Snow plowing routes.**

The main objective of this project is to design a mechanism and a cost-effective way for the City of Morris to complete its snow-plowing routes around the city limit areas. Information about the current routes, and the availability of resources will be obtained from both the Department of Transportation and the City Hall in Morris.

- **Expansion.**

Through meeting with various local officials from the Department of Transportation and the City of Morris's Planning Commission, the students will examine estimated future growth of the area, and formulate efficient networks to accommodate transportation needs.

3 Students' participation

Students will be divided into three groups, each of which will be responsible for the first three projects. The last project will be sort of a capstone using all results gathered from all the groups toward the end.

4 Dissemination

4.1 Written report

There will be written report written by each group on their individual project.

This report should be clearly written and must include, but not limited to, sections on *introduction, description of problems, approach to solving problem, data, informations used, assumptions, results and conclusions.*

4.2 Oral presentation

There will be an in-class presentation at the end of the quarter. This presentation will be opened to the public. Your oral presentation should be prepared with the following outline in mind:

- Introduction
- Substance & Clarity
- Enthusiasm & Communication